BEFORE
THE PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA

DOCKET No. 2001-65-C

IN THE MATTER OF:	)
	)
Generic Proceeding to Establish Prices	)
For BellSouth's Interconnection Services,	)
Unbundled Network Elements and Other	)
Related Elements and Services	)
	)

SURREBUTTAL TESTIMONY OF

DEAN FASSETT

ON BEHALF OF

New South Communications, NuVox Communications, Broadslate Networks, ITC^DeltaCom Communications, KMC Telecom

Proprietary Version

June 14, 2001

Q. PLEASE STATE YOUR NAME FOR THE RECORD.

A. My name is Dean Fassett.

Q. ARE YOU THE SAME DEAN FASSETT WHO PREVIOUSLY FILED DIRECT TESTIMONY IN THIS PROCEEDING ON JUNE 4, 2001?

A. Yes, I am.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. My rebuttal testimony will respond to a number of issues raised in the rebuttal testimonies of Ms. Caldwell, Mr. Latham, Mr. Pate and Mr. Greer filed on behalf of BellSouth Telecommunications, Inc.

Q. IN HIS REBUTTAL TESTIMONY MR. LATHAM SUGGESTS THAT VOICE GRADE LOOPS AND XDSL LOOPS ARE VERY DIFFERENT. IS THAT POSITION CONSISTENT WITH BELLSOUTH ENGINEERING AND PLANNING DIRECTIVES?

A. No. Mr. Latham has inappropriately implied that xDSL capable loops are very different from voice grade loops and has tried to give the impression that xDSL cannot be provisioned over next generation digital loop carrier ("NGDLC"). As BellSouth Witness Milner stated on page 12 of his direct testimony " Significantly, the same copper loops that are used to provide DSL services are also utilized to provide voice services to BellSouth's customers, as well as to other CLECs' customers." Mr. Latham and other BellSouth witnesses have erroneously stated that if a voice grade loop is provided over DLC or is transferred to be provisioned over a DLC system that xDSL service will be interrupted. BellSouth's ADSL Planning Directives RL:00-01-021BT dated 2/14/2000 strongly indicate that BellSouth like many other ILECs throughout the country are

presently deploying or will be deploying xDSL services in the very near future over digital loop carrier sites. The opening paragraph of that directive states: ** Proprietary**

" ADSL capabilities will need to be deployed in the near term at thousands of digital loop carrier sites."

The Executive Summary on Page 1 states

" By mid 2001, NGDLC systems with ADSL channel units are expected to be available for deployment. These new capabilities are an important factor in your ADSL design decisions." ** Proprietary**

Pertinent pages of this document produced in response to the Competitive Coalition's first set of interrogatories, item 2, Attachment 3, are attached as **Exhibit DRF-3.** A forward looking network and the network that BellSouth's Loop Technology Deployment Directives RL:01-03-001BT and ADSL Planning Directives RL:00-01-021BT advocate certainly support my statement that voice grade service and xDSL services can be provisioned over the same facilities.

Q. IN HIS REBUTTAL TESTIMONY MR. PATE STATED "IN MY OPINION, THERE ARE FEW, IF ANY, UNNECESSARY MANUAL PROCESSES IN THE LMU [Loop Make-up] PRE-ORDERING AND ORDERING PROCESSES." WOULD YOU PLEASE COMMENT ON THAT STATEMENT?

A. Yes. The point is that in an efficient forward looking network these manual processes should not exist. He has also stated that now CLECs in South Carolina have access to BellSouth's electronic loop makeup inquiry system as of November 18, 2000. While this is an improvement, he also acknowledges that "While 100% of BellSouth's loops are populated in Loop Facilities Assignment and Control System (LFACS) with certain

basic information, not all will have detailed loop makeup information." On page 4 Mr. Pate states "whenever CLECs must use the manual SI [loop make-up inquiry] process for these remaining loops, BellSouth will load the resulting loop makeup information in LFACS for future queries." In other words BellSouth will update their database system at the expense of CLECs. In an efficiently maintained forward looking network the detailed information would already be available in the electronic database and the 3 business – day interval that Mr. Pate refers to would be eliminated.

Q. STARTING ON PAGE 4 LINE 24 OF MS. CALDWELL'S TESTIMONY SHE IMPLIES THAT YOU APPEAR CONFUSED REGARDING BELLSOUTH'S ASSUMPTIONS CONCERNING LOAD COILS AND BRIDGED TAPS. MS. CALDWELL HAS APPARENTLY MISUNDERSTOOD YOUR TESTIMONY. PLEASE EXPLAIN.

A. Yes. On pages 35 and 36 of my testimony I explain that in an efficiently designed forward looking network that load coils and excessive bridged taps would not exist. Loops greater than 18,000 feet would be provisioned over fiber fed digital loop carrier. The engineering guidelines that support this forward looking design have been used by outside plant engineers for over 2 decades. BellSouth however in it's non-recurring cost study has inappropriately assumed a network that defies these very engineering guidelines. This is especially true when BellSouth assumes that an excessive number loops less than 18,000 feet will have load coils on them. A loop less than 18,000 feet that was designed in the early 70's before the introduction of digital loop carrier would not have been designed with load coils. The load coil and bridged tap assumptions used by BellSouth to develop loop conditioning charges are detailed on Page 36 of my direct

testimony are definitely inappropriate and should be rejected by this Commission. I'm certainly not confused on how engineering practices, guidelines or directives should have been applied over the last 30 years.

Q. ON PAGE 31 OF HER REBUTTAL TESTIMONY MS. CALDWELL STATES THAT "BELLSOUTH IS NOT AGRESSIVELY REMOVING LOAD COILS AS PART OF ANY REHABILITATION INITIATIVE." HOWEVER DON'T BELLSOUTH'S ENGINEERING GUIDELINES ACTUALLY INDICATE THAT ENGINEERS SHOULD BE REMOVING OR ELIMINATING LOAD COILS OR EXCESSIVE BRIDGED TAP WHEN THE NETWORK IS BEING MODERNIZED?

A. Yes. BellSouth's Loop Technology Deployment Directives RL:01-03-001BT dated March 28, 2001, strongly indicate that BellSouth engineers should be aggressively removing load coils and excessive bridged tap as the network is being worked on or modernized. The following statements are from those directives: ** Proprietary **

- Section 2.3.6 – "Metallic feeder cable facilities made available by cutover to carrier facilities at sites further along the route should be conditioned by the removal of all load coils." See page 8 of Attachment 1 of BellSouth's responses to the Competitive Coalition's first set of interrogatories, item 2, attached as **Exhibit DRF-4.**
- Section 4.4.3 & 9.5.2 – "whenever a splice is entered to unload pairs for any type of service order, a complement of pairs should be unloaded to provide for future requirements. The number of pairs to be unloaded should be based on the forecasted needs of the area and overall route plan,

and should be sized to care for a two-year period. Splicing should be done in 25 pair complements whenever feasible." (emphasis added) See pages 22 & 56 of Exhibit DRF-4.

- Section 2.3.3 – "These should also be changed as multiple is eliminated and as facilities are cutover to carrier." See page 7 of Exhibit DRF-4.
- Section 2.3.4 – "Facility relief plans for carrier system placements should be used to reduce distribution loop lengths to CSA limits and eliminate load coils." See page 7 of Exhibit DRF-4.
- Section 2.3.5 – "avoid load coil placements and ensure delivery of digital services such as ADSL." See page 8 of Exhibit DRF-4. ** Proprietary **

Q. ON PAGE 6 OF HIS REBUTTAL TESTIMONY MR. GREER STATES THAT THE SERVICE INQUIRY IS A 100 PERCENT MANUAL PROCESS. IN AN EFFICIENT FORWARD LOOKING NETWORK WOULDN'T IT BE APPROPRIATE TO ASSUME THAT THE MAJORITY OF SERVICE INQUIRY FUNCTIONS WOULD BE COMPLETED WITHOUT MANUAL INTERVENTION?

A. Yes, most definitely. If CLECs have electronic access to qualify their own loops and submit orders electronically, the functions of the Complex Rale Services Group ("CRSG") would only be needed on an fallout basis as I have indicated in my direct testimony and summarized in the chart on page 16 of that testimony.

Q. MR. GREER TRIES TO SUPPORT BELLSOUTH'S INAPPROPRIATE ASSUMPTION THAT 10 % OF ORDERS WILL FALLOUT IN THE SERVICE ADVOCACY CENTER BECAUSE OF THE LACK OF FACILITIES. ISN'T

THIS POSITION CONTRADICTED BY THE LOW FILL FACTORS THAT BELLSOUTH HAS INDICATED FOR ITS NETWORK?

A. Yes, Mr. Greer's argument again is without merit and is not supported by the low fill factors that BellSouth has indicated for feeder and distribution plant in their cost studies. The 2% fallout and 10 minute task time I recommend to correct is much more reasonable and consistent with efficiently operating forward networks.

Q. ON PAGE 8 ON HIS TESTIMONY MR. GREER STATES THAT YOU OFFERED NO SUPPORT FOR YOUR REVISED NUMBERS. WOULD YOU PLEASE COMMENT?

A. Mr. Greer has apparently overlooked my experience at NYNEX as the engineering and operations area manager. There I was responsible for the assignment organization as well as outside plant engineering and construction. So unlike Mr. Greer, I have first hand knowledge of what should be considered "reasonable" fallout in this process.

Q. ARE THERE ANY OTHER FACTORS THAT INDICATE THAT BELLSOUTH PERFORMS CONFORMANCE TESTING ON CONSTRUCTION JOBS AND WHY IS THAT IMPORTANT TO NOTE?

A. In response to the Competitive Coalition's first set of interrogatories, item 15, BellSouth produced 3 detailed work plans on three outside plant jobs that provided for the replacement of copper facilities with fiber fed digital loop carrier systems. In Attachment # 3 to the BellSouth response, Estimate C9078 within the Columbia District, the work prints indicated that conformance testing was to be performed at two cross-box locations prior to job completion. This means that any troubles or discrepancies would be identified and corrected if possible before the job was completed and any potential

services assigned. Hence any potential fallout subsequently in the assignment process is greatly reduced. Conformance testing is a standard practice for engineering and construction operations.

Q. MR. GREER STATES ON PAGE 9 LINES 2-4 THAT "IT IS PHYSICALLY IMPOSSIBLE TO MAKE RESISTANCE AND ATTENUATION MEASUREMENTS " SINGLE-ENDED" (MEANING WITH ONLY ONE PERSON)". IS HE CORRECT?

A. No. A single technician can perform these loop qualification tests . Using 3-M's Dynatel 965DSP –SA for line qualification testing a solo technician can perform the following tests:

Type of Test	Looking for
Volts DC	Crossed Battery
Ohms	Insulation Resistance (failures)
Length (Capacitance)	Pair Length – are tip and ring equal?
Load Coils	Presence of Load Coils and where
Special Resistance	Loop resistance and Tip/Ring Balance
Wideband Loss	Circuit Loss
Slope Wideband Loss	Losses at Prescribed Stepped Tones & Bridged taps
TDR	Opens, Bridged Taps and Loads

Q. MR. GREER STATES ON PAGE 14 LINES 17-18 THAT FEEDER PAIRS ARE NOT CONNECTED THROUGH THE CROSSBOX UNTIL THE CUSTOMER REQUESTS SERVICE. IN EFFICIENT FORWARD LOOKING NETWORKS

ISN'T IT COMMON PRACTICE TO PRE-CONNECT FACILITIES THROUGH CROSS BOXES PRIOR TO THE RECEIPT OF A SERVICE REQUEST?

A. Most definitely. In efficient forward looking networks it is common practice to provision facilities in a CT or connect through mode. In the design process engineers will usually indicate on work prints primary and secondary pair assignments to specific customer locations. As construction work and conformance testing is completed, technicians will place cross connections to connect the potential customer's location with cable facilities on the main frame in the CO. This eliminates the need to dispatch a technician when the customer requests service and expedites the service installation. As Mr. Greer also mentions, when any existing service is disconnected, those facilities are also left in a "CT" mode for the next customer to request service at that location. Dispatch rates are a fair assessment of how efficiently a service provider is managing their network. In forward looking networks a dispatch rate of 5% is reasonable.

Q. ON PAGE 19 OF HIS REBUTTAL TESTIMONY MR. GREER GIVES THE IMPRESSION THAT EVERYTIME A CUSTOMER REQUESTS A DS-1 OR DS-3 SERVICE THAT A NEW CLLI CODE HAS TO BE OBTAINED AND THAT IS AN VERY DIFFICULT PROCESS. PLEASE COMMENT.

A. As I mention in my direct testimony most locations where DS-1's or DS-3's are requested already have CLLI codes for that location. Just because another customer is requesting service at that location doesn't mean that a new CLLI codes must be obtained. Assume that BellSouth terminated an OC-12 system in a utility room within the basement of a building and now a CLEC was requesting a DS-1 at that same location. It is not necessary to obtain another CLLI code for the same location. In addition the DS-1 or DS-

3 services are derived from the principle system, in this example an OC-12 system, a no additional CLLI code is needed. If a new CLLI code was needed at another location the process is much simpler than Mr. Greer portrays.

Q. IN CRITICIZING YOUR RECOMMENDED TASK TIMES AND FALLOUT RATES FOR PROVISIONING ISDN/UDC LOOPS MR. GREER STATES ON PAGE 20 LINES 16-19. "EVEN IN A FORWARD-LOOKING NETWORK USING NEXT GENERATION DIGITAL LOOP CARRIER (NGDLC), BECAUSE ISDN/UDC LOOPS REQUIRE 3 DS0S, THE AVAILABILITY OF COMPATIBLE FACILITIES IS DIFFERENT FROM THAT OF POTS." IS MR. GREER'S STATEMENT CONTRADICTED BY BELLSOUTH'S LOOP TECHNOLOGY DEPLOYMENT DIRECTIVES?

A. Yes his statement is contradicted by BellSouth's Loop Technology Deployment Directives dated March 28, 2001. Under Section 5 – Technology Selection for ISDN Demand, Section 5.2.1 it states ** Proprietary** " The deployment of large platform GR-303 interfaces supporting widely deployed NGDLC systems will allow ISDN to be provisioned in a more POTS-like manner and will eliminate virtually all unique facility requirements to serve ISDN for new system placements." ** Proprietary ** See Exhibit DRF-4, page 28. BellSouth's own directives support my testimony concerning the provisioning of ISDN loops.

Q. IN HIS REBUTTAL TESTIMONY HAS MR. GREER PRODUCED ANY ENGINEERING PRACTICE THAT INDICATES CABLE PAIRS LESS THAN 18,000 FEET SHOULD BE LOADED?

A. No he has not, and I know of no such practice or guideline.

Q. ON PAGE 24 LINES 8-10 OF HIS REBUTTAL TESTIMONY MR. GREER STATES THAT IF THE LOAD COILS DO NOT ADVERSELY AFFECT VOICE TRANSMISSION, BELLSOUTH DOES NOT ACTIVELY REMOVE THE LOAD COILS. ARE THERE OTHER REASONS WHY THE PRESENCE OF LOAD COILS ON LOOPS LESS THAN 18,000 FEET CAN ADVERSELY AFFECT VOICE-GRADE SERVICES?

A. Yes. The presence of load coils on loops less than 18,000 feet greatly increases the possibility that loading rules (Resistance Design and Revised Resistance Design) will be violated adversely impacting customer service. Loading rules include:

- Minimum sum of customer end section and bridged tap – 3,000 feet
- Loaded bridged tap – none permitted
- Bridged tap between loads – none permitted
- Stations (customers) between load points – none permitted

In addition reduced modem speed is one of the most common complaints if loads are present on subscriber loops.

Q. ARE THE ANALOG PBX TRUNKS THAT MR. GREER TRIES TO USE AS JUSTIFICATION FOR THE PRESENCE OF LOADS ON LOOPS LESS THAN 18,000 FEET STILL PRESENT IN TODAY'S NETWORKS?

A. As I stated in my direct testimony those type of facilities were replaced many years ago and then only affected a very, very small number of cable pairs.

Q. DOES THE THIRD REASON MR. GREER GIVES FOR THE LOADING OF LOOPS LESS THAN 18,000 FEET HAVE ANY MERIT?

A. Absolutely not. Mr. Greer has mixed up two important numbers, 12,000 and 18,000 feet. Carrier Serving Area guidelines that were introduced in 1980 clearly state: " The maximum allowable bridged-tap is 2.5 kft, with no single bridged tap longer than 2.0 kft. All CSA loops must be unloaded." In 1983 Revised Resistance Design ("RRD") Guidelines were introduced. During the Louisiana UNE hearing, BellSouth Witness Latham stated that the assumptions in BellSouth's cost study were based upon RRD. Under RRD guidelines loops 18,000 feet or less, including bridged-tap, should be nonloaded and have loop resistance of 1300 Ohms or less.

Q. PLEASE RESPOND TO MR. GREER'S STATEMENT ON PAGE 28 STARTING AT LINE 16 CONCERNING YOUR TELEPHONY EXPERIENCE.

A. Mr. Greer has only described a very small portion of my experience in the telephony industry. Had he bothered to review my resume it would have been apparent that my experience was not limited to 43 offices in the Adirondack district. Prior to that assignment I was responsible for the Albany and capital district area of New York, which is far from a rural setting. Also during my splicing career I worked in the New York City area on a Brooklyn rehabilitation program during the winter months. On that assignment I worked in numerous manholes and building environments. One of the most interesting aspects of working in the metropolitan areas is that they had very few load coils if any in their local networks simply because loops typically are less than 18,000 feet in metropolitan areas. My experience has been in metropolitan, urban, suburban and rural environments, which is far more extensive than Mr. Greer's experience has been. Indeed, from his testimony in the Tennessee UNE hearing, I understand that Mr. Greer has almost no outside plant experience. In Tennessee, he testified that he had observed the

unloading of approximately 15 cable pairs over his career, been in two manholes and never been in a bucket truck used for work on aerial cables. Over my 30-year career, I have personally spliced literally thousands of cable pairs, which included the placement and removal of load coils in all types of plant, (underground, aerial, buried, building). In addition I have supervised numerous technicians in the performance of these work functions throughout my career in metropolitan, urban, suburban and rural work environments.

Q. MR. GREER ON PAGE 29 TRIES TO SUPPORT BELLSOUTH'S ASSUMPTION THAT ON LOOPS LESS THAN 18,000 FEET THERE WILL BE 2.1 LOADS AND 90 % OF THE TIME THOSE LOADS WILL BE IN THE UNDERGROUND. PLEASE COMMENT.

A. As I discussed in my testimony filed on June 4, 2001, pages 39 through 43, BellSouth assumption that 90% of these load coils will be in the underground is inappropriate and unsupported. First, load coil placement is determined by the length of the cable pair or facility, not the number of cable pairs within the sheath. Per BellSouth's ARMIS 4308 report to the FCC only 5.6 %, by length, of BellSouth's metallic cable facilities are in the underground. If only 5.6 % of BellSouth's cable plant is in the underground, how can 90% of the load coils be underground? This sounds like real "fuzzy math" to me. As I also point out in my earlier testimony, any load coil cases in the underground typically would contain a larger number of load coils. However as the network has been modernized with the deployment of digital loop carrier, these load coils were disconnected from the cable pairs but still remain on BellSouth's continuing property

records, even though they are not in service. See my direct testimony, pages 39 line 18 through page 41, for a more detailed explanation.

Q. STARTING ON PAGE 30 OF HIS REBUTTAL TESTIMONY MR. GREER IMPLIES THAT UNLOADING CAN ONLY BE PERFORMED IF THE CABLE PAIR IS SPARE. PLEASE EXPLAIN HOW UNLOADING OR LOOP CONDITIONING CAN BE PERFORMED WITHOUT SERVICE INTERRUPTION ON WORKING FACILITIES.

A. Yes. Mr. Greer is incorrect It is not necessary to have spare cable facilities in order to perform loop conditioning or load coil removal. If the complement contains working services, the technician can complete the unloading in the following manner by using a bridging jumper between the "IN" and "OUT" modules of the load and main cable splice. This makes a connection across the splice bypassing the load coils. (Steps number 7 & 12 on page 49 of my direct testimony). Then the technician can sever the connection between the main cable and load coil. With these simple steps 25 pair can be unloaded without any service interruption. Mr. Greer's argument regarding the need for spare cable facilities is unwarranted and it is quite evident he is not familiar with modern splicing techniques. I have performed this operation myself and supervised others in this operation many times in my career.

Q. MR. GREER CLAIMS THAT MUCH OF BELLSOUTH'S UNDERGROUND CABLE IS PULP AND THAT UNLOADING PULP CABLE REQUIRES ADDITIONAL TIME. PLEASE COMMENT.

A. The unloading process for pulp cable should not vary much from Plastic Insulated Cables ("PIC" cable). Technicians can identify the 50 or 100 pair groups with a PULP cable

simply by counting either clock-wise or counter clockwise depending whether the technician is facing or looking away from the central office. Secondly in order for load coils to function correctly it is necessary at the time of initial placement to ensure that the same load coil is connected to the same "IN" and "OUT" main cable pair. Hence when splicing initially, the "blue/white" IN load coil has to be connected to the same main cable pair as the "blue/white" OUT load coil. Otherwise the load coil would be split and not function correctly. To verify any complements, tone could be sent either using an automatic tone identifier system or by having another technician send tone. This should not be required in all situations where PULP cable is present and should take minimal time. This has been accounted for as steps 6 and 11 on my chart on page 49 of my direct testimony.

If present at all, PULP cable will be in larger cable sizes and technicians will be able to unload much larger numbers of load coils. It would certainly not be acceptable to enter a 2700 pair PULP or PIC cable and only unload 10 pairs.

Q. HAS BELLSOUTH PRODUCED ANY DOCUMENTATION INDICATNG THE AMOUNT OF PULP CABLE THEY HAVE PLACED IN THE LAST 5 YEARS AND HOW DID THOSE PLACEMENTS COMPARE TO PIC CABLE PLACEMENTS?

A. Yes. In response to the Competitive Coalition's first interrogatories, items 16 – 19 BellSouth provided information on their actual PULP and PIC cable placements in South Carolina for the last 5 years. Their PULP placements were only a very, very small fraction compared to PIC cable placements. In 2000 they only placed 30 feet of PULP cable in South Carolina. Copies of this discovery are attached as **Exhibit DRF-5.**

Q. ON PAGE 34 LINES 24-25 MR. GREER DISUSSES INDIVIDUAL SPLICE "BUTTONS". WOULD YOU PLEASE COMMENT?

A. Yes. The individual splice "buttons" as Mr. Greer refers them are actually "B" wire connectors that we used in the early 1970's. In many areas they were referred to as "beanies" or "good-n-plenties". Most ILECs ceased using them in the mid 1970's when modular splicing was introduced. Many companies forbid their technicians from using them and took any supplies on the shelves do to connection and data transmission problems. In response to data request # 23 in this docket BellSouth responded that they ceased the use of "B" wire connectors in the mid 1970's. Any cables that still are spliced with "B" wire connectors are certainly past their useful life and been depreciated long ago. Any such connectors should have been replaced long ago and, if present, would be contributing to their trouble reports and generating customer complaints.

Q. DOES THAT CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, Thank you.

Exhibit 3
(Contains Proprietary Information)

BellSouth Telecommunications, Inc.
South Carolina Public Service Commission
Docket No. 2001-65-C
NewSouth Communications 1st Interrogatories
May 22, 2001
Item No. 2
Page 1 of 1

REQUEST: To the extent not included in the response to Item 1, produce BellSouth's 2001 Loop Technology Deployment Directives # RL: 01-03-001 BT; RL: 00-11-023 BT (Unbundled Loop Strategies Update); # RL: 00-01-021 BT (ADSL Planning Directives); and # RL: 01-02-006 BT (Fiber Relief Strategies for the Loop).

RESPONSE: Responsive proprietary documents are being provided subject to the nondisclosure agreement.

BellSouth Telecommunications, Inc.
South Carolina Docket No. 2001-65-C
NewSouth Comm.'s 1st Interrogatories
May 22, 2001
Item No. 2
Attachment No. 3

PROPRIETARY ATTACHMENT

RL: 00-01-021BT

BELLSOUTH

file code: 204.000

subject: ADSL Planning Directives

type: Information Letter

date: February 14, 2000

replaces: RL: 99-06-001BT

related: 915-800-019PR

to: Attached Distribution List

entities: BellSouth Telecommunications, Inc.

from: D. A. Kettler, Executive Director/NVP – Science & Technology

description: Planning recommendations for the deployment of ADSL, remote DSL access multiplexers and remote access multiplexers.

* * *

This letter transmits our recommendations for the planning and deployment of ADSL technologies. While many of the long range planning decisions for ADSL are being driven by headquarters organizations, there are many current planning and deployment decisions that field planners and capacity managers will need to resolve. ADSL capabilities will need to be deployed in the near term at thousands of digital loop carrier sites. The rapid ADSL deployment that will be required over the next few years to meet high speed data demand and competition is a very important step for our company. The use of these directives will permit you to optimize the design of our high-speed network.

Questions from your organization may be directed to Jim Jackson at (205) 977-5032 or to John Jackson at (205) 977-5043.

Original signed by D. A. Kettler

D. A. Kettler
Executive Director/ NVP – Science & Technology

Attachments

Executive Summary

The pace of ADSL deployments for the next few years will need to continue at a rapid pace to provide high speed data services to a broad cross section of Bellsouth customers. ADSL capabilities will need to be deployed in the near term at thousands of digital loop carrier sites. Initial ADSL deployments will use digital subscriber line access multiplexers (DSLAMs) or remote access multiplexers (RAMs). By mid 2001, NGDLC systems with ADSL channel units are expected to be available for deployment. These new capabilities are an important factor in your ADSL design decisions

The rapid ADSL deployment that will be required over the next few years to meet high speed data demand and competition will provide many opportunities to maximize value and minimize investments if carefully planned and deployed. Failure to carefully plan and deploy ADSL equipment will result in higher costs, increased labor requirements, and a lower quality of service for customers.

Summary of the planning considerations included in this directive:

- Loops qualified for ADSL
  - Non-loaded 1300 Ohm resistance design
  - Carrier Serving Area design
  - Not on same pair with ISDN, P-phone, DDS/SynchroNet, program audio, DAML
- DSLAM functionality must be moved to DLC RT site to provide ADSL on DLC loops
  - When activating Remote DSLAM or Mini-RAM, all copper ADSL lines in the affected FDIs must be cut-over to the Remote DSLAM or Mini-RAM –or
  - If copper ADSL capacity in FDIs is greater than the 1-2 year forecasted ADSL demand, all lines requesting ADSL should be moved from DLC to copper feeder to provide ADSL rather than installing Remote DSLAM or Mini-RAM
  - Mini-RAM configurations are available in 8 line capacity and will be available in a 16 line version in the first half of 2001.
  - Remote DSLAM configurations currently available for large ADSL requirements
    - 192 Line MESA2 cabinet
    - 144 Line MESA2 cabinet with OC3 multiplexer
    - Hut & CEV packages with 48, 96, & 144 Lines capacity
    - 96 Line 52B cabinet
  - Terminate Remote DSLAM pairs in FDI where practical to provide maximum flexibility
  - Splice Remote DSLAM to DLC derived pairs where not practical to terminate pairs in FDI.
    - Splice to vacant capacity to minimize moving lines
    - When cut-through card is replaced with splitter to activate the 1st ADSL line on that slot, all services on that card that use spectrum above 4kHz must be moved to non-ADSL DLC capacity.

- Practical Mini-RAM limit in a cabinet is 2 Mini-RAMs, 16 –32 ADSL lines, depending on space, power, heat dissipation capacity, and the availability of the PMR16 solution

- Sizing and Relief Steps for Remote Solutions
  - If the AMR8 or PMR16 solutions will serve 2 year demand (maximum of 32 lines), these solutions should be used.
  - If Mini-RAM solutions will not serve 2 year demand, and a cabinet based solution will be used, use the ADJ96 if it will serve the 2 year demand.
  - If neither Mini-RAM nor ADJ96 solutions will serve demand through 2001, and a standalone cabinet based solution will be used, size the remote solution to serve 5 year demand.
  - If Mini-RAM solutions will not serve 2 year demand, and a structure based solution will be used, size the remote solution to serve 2 year demand.
  - If Mini-RAM solutions have been deployed and actual plus 6 month forecasted demand exceeds Mini-RAM(s) capacity; size cabinet based solutions to cutover Mini-RAM(s) and serve 2 year demand if an ADJ96 will serve that demand. If the ADJ96 will not serve the cutover plus 2 year demand, size the remote solution to serve cutover plus5 year demand. Size structure based solutions to cutover Mini-RAM(s) and serve 2 year demand.
  - If ADJ96 or larger cabinet solutions have been deployed and actual plus 6 month forecasted demand exceeds capacity, following the long range plan for the CSA, an additional housing should be established. If the ADSL capacity is provided at the new site it should be sized to cutover ADSL lines for the FDIs that site will serve and to serve the 5 year forecasted demand. If the new ADSL capacity is added at the same site it is not necessary to add any capacity for cutover of existing ADSL.
  - If STR48 or larger solutions have been deployed and the actual plus 6 month forecasted demand exceeds capacity, additional ADSL shelves should be added at the structure, sized to serve the 2 year demand. When an additional shelf is added to a STR48 solution for growth the connection to the ATM network must be converted to DS3 feeder.
  - Use new ADSL capabilities in both Alcatel and Marconi NGDLC systems beginning in the third quarter of 2001

Exhibit 4
(Contains Proprietary Information)

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South Carolina Public Service Commission
Docket No. 2001-65-C
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BellSouth Telecommunications, Inc.
South Carolina Docket No. 2001-65-C
NewSouth Comm.'s 1st Interrogatories
May 22, 2001
Item No. 2
Attachment No. 1

PROPRIETARY ATTACHMENT

BELLSOUTH

file code: 205.0200 **RL:01-03-001BT**

subject: Loop Technology Deployment Directives

type: Deployment Directive

date: March 28, 2001

distribution list: See attached list

related letters: RL:98-09-019BT

to: Network Vice Presidents - Network Operations
Assistant Vice-Presidents – Network
(see attached distribution list)

entities: BellSouth Telecommunications, Inc.

from: Network Vice President - Technology Planning Deployment Center

description: 2001 Issue of Loop Technology Deployment Directives

* * *

Core business strategies regarding new loop facility requirements for 2001 were recently addressed by Messrs. Smith & Odom in their letter dated February 6th. In keeping with those strategies, this letter transmits the 2001 issue of the BellSouth Loop Technology Deployment Directives (LTDD). It provides a comprehensive package of directives and recommendations regarding the deployment of loop technologies to support BellSouth's local loop network transformation from a copper-based narrowband network to a fiber-based broadband network. These directives are integrated with Key Business Activity (KBA) initiatives by leveraging investments in new platforms and infrastructure to provide for future services and revenues and by minimizing investments in older and short-lived technologies. An executive summary highlighting critical issues immediately follows and a summary of major changes is provided later in this document. When using an electronic copy of this document, new internal and web-based hyperlinks will permit quick access to sections of interest or associated documents. Changes from previous directives are shown in *blue italics.*

In order to be successful in the future, we must work together to make decisions everyday to consistently implement the strategies outlined in this document. The recent strategy letter should be studied by all loop planners to ensure a common understanding and focus on critical deployment decisions for our company. This letter strongly reinforces a core BST strategy to deploy fiber distribution as the first choice for all new residential developments. A copy of the letter can be obtained by clicking on the following icon .

This document supersedes and updates all information previously contained in RL:98-09-019BT, the 1998 issue of the BellSouth Loop Technology Deployment Directives. It also incorporates provisions of previously issued directives or documents concerning loop technology deployment strategies, including:

RL 01-03-013BT	Terminating Universal versus Integrated DLC Systems In Offices With Surplus Analog Lines
RL: 01-02-006BT	Fiber Relief Strategies for the Loop: WDM, Bit Rate Upgrades
RL 00-11-023 BT	Unbundled Loop Strategies Update
RL:00-01-021BT	ADSL Planning Directives
RL:99-09-022BT	IFITL/FITL Planning Considerations
RL:99-08-014BT	Fiber to the Cell Site Loop Strategies Update

In addition, these directives reflect numerous product approvals for interoperability of NGDLC platforms with digital switches, digital cross-connects, and COT channel banks. They also reflect approval of recently approved small DLC system configurations and OC1 fiber multiplexers. Previously issued clarifications to cutover sizing, fiber distribution design, GR-303 terminations, DAML and HDSL issues, and planning documentation are also incorporated into the 2001 LTDD. Lastly, this issue includes the impact of Asset Turns analysis per Key Business Activity 1.1 on loop deployment directives, including alternatives for low growth routes and wire centers. It continues to highlight the use of existing facilities and consideration of minimum capital alternatives.

An updated copy of the directives along with related indexes and summaries are attached. Electronic copies are available via the Technology Directives web page. The index and summaries can be used to hyperlink quickly to any section for a more detailed explanation of each of these items. Other web-based hyperlinks will provide access to a checklist or job aid, flowcharts, and related documents. Questions or comments from your organization regarding these directives should be directed to Jim Jackson at (205) 977-5032 or Stan Fory at (205) 977-7158.

Orignial Signed by W. J. McNamara

Network Vice President - Technology Planning Deployment Center

Attachments

2001 LOOP TECHNOLOGY DEPLOYMENT DIRECTIVES

RL:01-03-001BT

1 INTRODUCTION

This document supersedes and updates all information previously contained in *RL:98-09-019BT*, the *1998* issue of the BellSouth Loop Technology Deployment Directives *(LTDD). Outline headers and numbers have been added for clarity and specific wording* changes from the previous document are highlighted in *blue italics.* The *LTDD* provides a comprehensive package of directives and recommendations regarding the deployment of loop technologies *to support BellSouth's local loop network transformation from a copper-based narrowband to a fiber-based broadband network. These directives are integrated with Key Business Activity (KBA) initiatives by leveraging investments in new platforms and infrastructure to provide for future services and revenues and by minimizing investments in older technologies.* As with the previous documents, these directives should be used for selecting the appropriate deployment solution, but should not be used to justify an unreasonable plan. Always use sound engineering judgment to select the most appropriate relief strategy, in keeping with overall corporate strategies *documented* in *these directives*. Furthermore, relief plans must be implemented in context with an overall route plan and relief strategy.

1.1 Core Business Strategies

These directives continue to reinforce our core BST strategy to quickly move towards NGDLC and FITL which should be used to drive our loop deployments and which position the network for future services. The strategic initiatives related to these issues are listed below. Fundamental strategies and specific deployment directives or recommendations are outlined for each area of loop technology deployment in the following sections of this document. *Basically, there are two distinctly different decisions that have to be made regarding our network. First, what do we put in the ground for new build opportunities? Second, how do we deliver new services to customers on embedded facilities? While it is important for our loop planners and engineers be empowered to make their best, informed decisions for day-to-day deployment issues, there are certain boundaries and core business strategies that cannot be compromised. These are summarized below in keeping with the recent strategy letter from Messrs. Odom and Smith .*

1.1.1 Impact of Satellite Video and ADSL on Fiber Distribution Strategy

BellSouth has made several recent informed business decisions to aggressively deploy new ADSL platforms to respond to important customer requirements for customers served via existing metallic networks. Similarly, there has been some activity regarding a new business model for our video strategy. Neither of these decisions should be perceived to diminish in any way our core business strategy to deploy fiber distribution as the first choice platform for new residential developments. As the convergence of high-speed data services and voice services continues over the next ten years, the bandwidth requirements will continue to increase significantly and the architecture that can meet these requirements is fiber. While we are continuing to work with our vendors on Fiber-to-the-Home (FTTH) architectures, it is clear that BellSouth must avoid the placement of new copper distribution by deploying Fiber-to-the-Curb (FTTC) now. Consistent with our initial strategies, the FTTC fiber distribution infrastructure can be evolved to future FTTH architectures, whereas the only evolution path for copper distribution would involve capital-intensive rearrangements or replacements. Ethernet PC-Data (provided per BellSouth direction) is not being implemented in additional locations by decision of the BellSouth NCU in anticipation of new ADSL components for FITL-A and the new MX product line which includes ADSL rather than Ethernet per BellSouth request. ADSL via fiber distribution will be able to provide transmission rates unaffected by the length of the facility.

2.2.2 Adjusted planning forecast

Where documented activity patterns or specific demands can be shown to exceed the official forecast, then appropriate adjustments should be made to establish a planning forecast to determine network shortages and proposals. An example is where the impact of new development activity in one route or area is masked in the official forecast by substantial line losses in another route or area. Another example is where accelerating demands for DS1, DS3, and other broadband services may be consistently or obviously outpacing the official forecast. However, differences between the planning forecast and official forecasts should be identified and fully documented *and reviewed with management.* Deployments and expenditures based on these forecast differences should also be identified for each of the deployment decisions outlined in other sections of this document and in the budget documentation discussed later in this section.

2.2.3 Unbundled loop forecast

Identify high activity wire centers, areas and sites for unbundled loops. These are wire centers where CLECs are already collocated or where CLEC collocation is imminent. It should be noted that wire center forecasts now include a forecast for unbundled loops (See Section 2.2). The architecture used to provide unbundled loops is the same architecture that would be used to provide a BellSouth private line of the same bandwidth or transmission requirement. Where CLECs are collocated in a wire center, a minimum of 3-5% of line requirements should be expected via unbundled loops. Unbundled loops should be provisioned in the loop network much like non-switched or non-locally switched special services. See RL:00-11-023BT for updated definitions and provisioning directives.

2.3 Review And Update Loop Network Sectionalization

2.3.1 Route Sectionalization

All major distribution connections, route branch points and major tapers, and remote electronics sites should be reflected. Old "rural" sections and allocation areas now overgrown with numerous connect points and cable branches or tapers can mask demand relationships, shortages, and plausible relief alternatives. Sectionalization must be sufficient to allow identification of demand locations, cumulative demands, and relief alternatives. An example of inadequate sectionalization is shown on *Figure 2-1*.

2.3.2 Distribution Areas (DAs)

In metro and suburban areas, Distribution Areas (DAs) are the fundamental geographic building blocks for loop planning and administration. Each DA represents a collection of distribution service cables and terminals that are all considered or intended to have the same connect point to the network, usually a cross-connect box or large building terminal in the case of metallic distribution. Typical sizes included approximately 600 LUs or business lines and distribution loop lengths were typically short (3-6 kft). These should be created or changed as facilities are placed for new residential or business developments.

2.3.3 Allocation Areas (AAs)

Several DAs could be grouped into an Allocation Area (AA) for administering similarly designed metallic feeder pairs, or for administering large collections of feeder facilities that could not be easily divided due to multiple terminal appearances by the same pairs. These should also be changed as multiple is eliminated and as facilities are cutover to carrier.

2.3.4 Rural Allocation Areas (RAAs)

Rural Allocation Areas (RAAs) have been used to designate rural and fringe areas with no planned development. *An RAA* also represents a collection of distribution service cables and terminals that are all considered or intended to have the same connect point to the network, usually a cross-connect box. Distribution loop lengths are typically longer (12 kft and longer) and demand varies widely. These should be deleted or changed as facilities are placed for additional growth or as DAs are created to administer new development areas. *Facility relief plans for*

carrier system placements should be used to reduce distribution loop lengths to CSA limits and eliminate load coils.

2.3.5 Carrier Serving Areas (CSAs)

Carrier Serving Areas (CSAs) were added to designate the collection of DAs served by a Remote Terminal (RT) location or locations. Total loop lengths from the RT *should be* limited to 9 kft of 26 GA cable or 12 kft of 24 or 22 GA cable *to avoid load coil placements and ensure delivery of digital services such as ADSL.* Sometimes a CSA served a single DA, and other times, many DAs. Connect points for the DAs may or may not be collocated with the CSA. The CSA and its RT facilities may also become part of a larger Allocation Area or may become synonymous with a single Allocation Area. A CSA typically serves only one RAA because of the longer loop lengths. CSAs should be added or changed as new RT sites are added or as changes are made to the DA/AA/RAA configuration.

2.3.6 CO Carrier Serving Area

The area around the CO should be considered a CSA with a maximum loop length of 9 kft to allow provisioning of VF special services without special service design requirements. See RL:01-03-029BT for additional information. Metallic feeder cable facilities made available by cutover to carrier facilities at sites further along the route should be conditioned by the removal of all load coils.

2.3.7 Fiber Service Areas

Prior to fiber distribution, the common denominator for all of these areas has been the metallic distribution cable. DAs and CSAs have been used much in the same way to support fiber distribution deployments to date. In this case, connect points for the DAs and supporting CSA are located at the same place, the TSI of the NGDLC/FITL platform. In some cases, both fiber distribution and metallic distribution are served from the same RT site, each serving different portions of the same CSA. However, maintaining the same CSA configuration created for metallic distribution to introduce fiber distribution may mask fiber distribution opportunities and may not optimize fiber distribution design for either near-term deployments or for long-term broadband needs. Separate Fiber Service Areas (FSAs) may need to be identified as discussed in *Section 2.4* below.

2.4 Distribution Planning

2.4.1 Identify residential growth areas and document expected demands

Identify areas with new residential development growth **[P110]**. These may include single large "named" developments with detailed master plans, as well as areas along old rural routes with a metro-sprawl development pattern of numerous small to medium-size developments. *Document expected demands for the forecasted number of living units based on demands in similar type developments and area.*

2.4.2 Limits for metallic distribution additions

In order to avoid the perpetuation of a metallic distribution network and maximize fiber distribution deployments in keeping with the strategic initiatives in *Section 1.6.4*, limits should be established for metallic distribution additions to the existing infrastructure **[P120]**. For example, if the existing backbone, x-box, and/or RT housing can only accommodate demand for 60 more LUs, then distribution placements beyond this limit should be designed for fiber distribution, along *with* planned infrastructure placements. Expected demand from LUs yet to be completed, but for which facilities have already been placed, should also be considered. Separate or sequential decision processes regarding distribution and feeder placements for these areas can lead to exhaust of backbone and infrastructure as multiple distribution extensions or expansions are planned, engineered, and implemented. An example of the impact of sequential distribution decisions on infrastructure placements is shown on *Figure 2-2*. *Also see DA/CSA re-sectionalization issues discussed in 2.4.4 below.*

average ADSL penetration rates from ADSL business cases, the table below provides a way to extend the 2001 demand projection to a 2004 forecast.

2001 Demand Multiplier	2002	2003	2004
	146%	186%	214%

4.2.2 ADSL forecast for other areas

For areas where no forecast is available from the ADSL Plan managers, the table below provides a means for projecting ADSL demand for primarily residential areas. Forecasts for areas that are primarily business should be developed jointly with local business sales organizations.

Year	1	2	3	4	5
% LUs Taking ADSL	1.16%	4.32%	6.82%	9.95%	12.70%

4.3 Fiber Distribution and ADSL

*High-speed data capability using an ADSL user-network interface is a planned capability for Marconi fiber distribution systems. Components to upgrade Marconi's existing FITL-A product to provide ADSL service were field tested in 4Q2000. Marconi's MX fiber distribution system was also field tested in 4Q2000 with ADSL capability. See Section 3 for discussion of fiber distribution systems and deployments. Deployment of ADSL components is targeted for 9/2001 for FITL-A and 12/2001 for new MX platforms pending completion of BST NMS development. If ADSL demand is in an existing or planned fiber distribution area **[A150]**, then deploy ADSL components, when available, for the fiber distribution system **[A160]**. Funding for ADSL components should be provided by CMS or NCU business plans.*

4.4 CO-based ADSL via Metallic Feeder Cable

This arrangement uses a CO-based DSLAM to combine the telephony signal from a circuit switch with the data signal from an ATM switch onto the same metallic feeder pair. The signals are split or filtered at the living unit by ISP or customer- provided devices. See RL:00-01-021BT for details.

4.4.1 Impact of HDSL or multi-line DAML remotes

*If there are remotely located devices providing HDSLs or multi-line DAMLs (4:1, and 8:1) to the ADSL service area **[A300]**, then CO-based ADSL facilities should not be used **[A310-A340]**. Furthermore, HDSL remote transceivers, whether deployed from remote repeater shelves or fiber optic multiplexers, dictate the cutover of all CO-based copper ADSL lines that are in the same sheath or binder group as the HDSL provided service to a collocated ADSL remote solution. The same is true for >4:1 multi-line DAML repeaters. See spectrum management discussion in Appendix 4-1.*

4.4.2 Qualified non-loaded pairs available

*ADSL will generally work at some data rate within our service offering on any non-loaded loop meeting 1300-ohm resistance design or carrier serving area design rules. If ADSL capable copper feeder facilities are available to meet the 2-year demand at an FDI **[A310]**, then a CO-based DSLAM and existing or proposed feeder pairs should be used to support ADSL services **[A320]**. If the area is also fed by DLC, the copper facilities should be used to support ADSL and the remote solution deferred. See OSPE M&Ps 915-800-019PR. Furthermore, ADSL cannot work on loops with ISDN, P-Phone, DDS/SynchroNet, program audio, and any service provided via DAML since they all use spectrum above 4kHz. Transfer other working lines to DLC or other copper pairs to provide ADSL capacity on qualified pairs.*

4.4.3 Unloading pairs for ADSL and other special services

As with other types of special service requests (see Section 9.5.2), whenever a splice is entered to unload pairs for any type of service order, a complement of pairs should be unloaded to provide for future requirements. The number of pairs to be unloaded should be based on the forecasted needs of the area and overall route plan, and should be sized to care for a two-year period.

5 TECHNOLOGY SELECTION FOR ISDN DEMAND

This section summarizes the decision process and deployment directives and recommendations for satisfying ISDN demand requirements. These are highlighted by the "Technology Selection for ISDN Demand" flowchart. If there is NO ISDN demand expected within 3 years **[I100]**, then go back to Section 2 and the associated flowchart of loop planning and technology selection to continue the loop deployment decision process **[P200]**. As previously discussed, ISDN demand may lead to specialized facility treatments and therefore these should be determined first and used to modify the PMO for other deployment decisions. For example, the capacity of carrier systems placed specifically to serve ISDN should be included in the total available NGDLC/FITL and DLC capacity to be utilized in that CSA; or the impact of cutover activities to provide existing metallic pairs for ISDN should be reflected in the number of carrier channels used at the cutover site and in the number of metallic pairs available at the ISDN site. The following items in this section outline specific directives and recommendations, critical factors, flow chart references, and other issues related to technology selection for ISDN demand.

5.1 Fundamental Strategies

Technology selection for ISDN demand should be guided by the following fundamental strategies:

5.1.1 Existing qualified facilities

Existing qualified facilities, including non-loaded metallic cable and Mode 1 universal carrier, should be used to satisfy ISDN demand.

5.1.2 *GR-303* systems

ISDN can be treated in a POTS-like manner as Next Generation Digital Loop Carrier (NGDLC) systems, using the large *GR-303* interface, become the standard transport facility for all narrowband demand, including ISDN. Small *GR-303* (96-line) systems, such as SLC-5 FP-303, should only be proposed when required to meet specific ISDN demand in conjunction with other narrowband relief plans. These small systems will generally be limited to 5ESS switch capacity specifically set-up for small *GR-303* systems and each system deployment must be coordinated with Switch Capacity Management and *NCU* representatives.

5.1.3 Funding for ISDN deployments

New facility placements should generally be selected and designed to accommodate demand for POTS and other tariffed special services. Costs for extraordinary changes in these new facility proposals required only to meet ISDN demand should be funded via specific *NCU* initiatives. With the availability of small ISDN-only systems, such as the FITEL or Conklin mini-shelf, special assemblies will not be required and other systems will not be deployed to preposition for ISDN. Furthermore, the ADTRAN "Total Reach" DSL can extend the loop length for ISDN provisioning via non-loaded pairs. See *Tables 5-1 and 5-2* for a list of provisioning or deployment alternatives. Items 1-9 on *Table 5-1* reflect alternatives discussed in this section and are generally funded through normal growth budgets, except for the ISDN mini-banks and DSL repeater plug-ins. These components are funded by the *NCU* and are generally placed on a service-order basis. Items 10-20 on *Table 5-2* represent alternatives that would generally require additional funding. Most of these options have been eliminated in favor of the mini-shelf arrangement.

5.2 *GR-303* Systems & Planning

5.2.1 NGDLC systems

GR-303 has been approved for the *Marconi* NGDLC/FITL systems *with the* 5ESS, DMS-100, *and EWSD. GR-303* has also been approved for the *Alcatel* NGDLC system with the 5ESS, *DMS-100, and EWSD.* The deployment of large platform *GR-303* interfaces supporting widely deployed NGDLC systems will allow ISDN to be provisioned in a more POTS-like manner and will eliminate virtually all unique facility requirements to serve ISDN for new system placements. See

Sections 8 and 9 for discussion of *GR-303* deployment decisions and parameters. Other NGDLC/FITL or DLC alternatives for ISDN using the BRITE card implementation cannot be integrated. See *Tables 9-1 through 9-5* per *Section 9* for service capabilities for various carrier system and switch types.

5.2.2 SLC-5 FP303

SLC-5 FP303 is available for *GR-303* integration with a No.5ESS, but system size is limited to 96 lines. These arrangements are generally not cost effective for low ISDN demands and should only be considered when ISDN demand is known or imminent and only in coordination with specific *NCU* funding. Furthermore, deployment of these small systems to satisfy a forecast for unidentified ISDN demand should be avoided. This means that narrowband facility placements triggered by forecasted demand should be based on requirements for POTS and services other than ISDN.

5.2.3 *GR-303* switch capacity planning

Planning for *GR-303* switch capacity must be done in conjunction with switch process planners and equipment engineering to ensure appropriate quantities of *GR-303* and TR-008 interfaces are ordered, installed, and utilized. *As discussed in 5.2.1 and Section 9, GR-303 has been approved for the Marconi and Alcatel NGDLC/FITL platforms for all of the major digital switches.* These platforms allow the large system terminations, typically 175-672 lines (see *Sections 8 and 9*). Planning for this capability should reflect the increasing penetration of these NGDLC platforms in loop deployment plans. SLC-5 FP303 is available for *GR-303* integration with a No.5ESS, but ISDN is the primary driver for the establishment of these 96-line systems. Associated switch capacity consists of an IDCU peripheral(s) on an ISDN equipped switch module specifically designed for these small 96-line systems. This switch capacity should be utilized to respond to firm or immediate ISDN demand as discussed in the following paragraphs. However, the economics for this serving arrangement are very sensitive to actual ISDN demand and, as previously discussed, the deployment of small *GR-303* systems to satisfy a forecast for unidentified ISDN demand should be avoided. Due to its significant costs, the deployment and use of *GR-303* switch capacity designed for these small systems must be coordinated with Switch Capacity Management and IBU representatives.

5.3 Existing or Planned ISDN System Capacity

5.3.1 Existing FITEL or Conklin mini-shelves (Alternative 0)

Existing ISDN-only systems, such as the FITEL and Conklin mini-shelves, would be the first choice for serving ISDN **[I150]**. These are obviously not applicable for areas served with fiber distribution facilities and NGDLC/FITL systems.

5.3.2 Existing *GR-303* or planned NGDLC/*GR-303* systems (Alternative 1)

Existing *GR-303* systems with available capacity or NGDLC systems with large *GR-303* interfaces planned for other relief **[I200]** should be used to provide integrated access for ISDN **[I210]** and other narrowband demand when sufficient capacity is not available on existing ISDN-only systems **[I150]**. Existing *GR-303* systems may have been placed for previous ISDN demand or NGDLC systems e/w a large *GR-303* interface may be proposed for feeder cable replacement activities **[R002]** as discussed in Section 4 or for other narrowband relief **[N001]** as discussed in Section 6. With *GR-303*, ISDN can be provisioned and planned in a POTS-like manner. Once the *GR-303* system is established, the economics of providing ISDN over digital loop carrier or metallic based facilities is much the same as that for POTS. Obviously, the number of *GR-303* systems in service will be small during the near term. To ensure maximum utilization of dedicated *GR-303* switch capacity, these already available or planned systems should be the first choice for providing ISDN. Other *GR-303* considerations in the following sections are driven by ISDN demand.

303 switch termination equipment. Assuming a need for switch relief, these minimum termination capacities are shown on Appendix 8-3.

9.4 Use or cutover existing universal or dedicated special service system

Where available, use an existing universal or dedicated special service system to serve NS/NLS specials, including unbundled loops **[S200/S210]**. POTS lines may be transferred to other existing or proposed integrated facilities to accommodate the additional NS/NLS specials on the universal system. As discussed in *9.6.1 below*, a dedicated special service system is always available as part of an NGDLC and/or FITL system platform. Consider or propose additional carrier systems to serve switched services per *9.2.4 above*.

9.5 Metallic Feeder Cable

9.5.1 Use or cutover existing or proposed metallic pairs

Use existing or proposed metallic pairs to serve NS/NLS specials, including unbundled loops **[S400/S410]** where an existing universal or dedicated special service system is not available **[S200]**. These metallic pairs may be made available by cable replacement activities (Section 4), *by* the placement of new metallic facilities *to fill gaps or extensions*, or by cutover activity to DLC at the farthest CSAs for growth along the route. Existing metallic pairs serving the CSA may also be made available by transferring POTS lines to other existing or proposed integrated facilities to accommodate the additional NS/NLS specials *or unbundled loops* on the metallic pairs.

9.5.2 Unloading pairs for special services

As with any special service requests, including ADSL (see Section 4.4.3), whenever a splice is entered to unload pairs for any type of service order, a complement of pairs should be unloaded to provide for future requirements. The number of pairs to be unloaded should be based on the forecasted needs of the area and overall route plan, and should be sized to care for a two-year period. Splicing should be done in 25 pair complements whenever feasible. Of course these decisions must be tempered by the availability of existing facilities and the economics of the particular circumstances.

9.6 NGDLC/FITL Systems

In keeping with previous directives and as documented in *Section 8* of this document, NGDLC and FITL are the first choice for new facility placements.

9.6.1 NGDLC/FITL virtual RT terminations

An NGDLC/FITL system is a large capacity carrier platform which can utilize a time slot interchanger and software control to establish multiple "virtual" system terminations, TR-008, *GR-303*, and/or universal, in order to efficiently utilize transport and switch interface facilities. One (or more) of these "virtual" systems may be a dedicated special service system terminated as UDLC on an NGDLC COT channel unit shelf or as an Integrated Network Access (INA) system on a Digital Crossconnect System (DCS). All of these system terminations appear as "virtual RTs" in the remote NGDLC common shelf and are not directly associated with any channel shelf capacity. Electronic cross-connects or assignments are used to associate a specific channel from the channel shelves or ONUs to a particular line termination from the CO. This is a major advantage for NGDLC platforms over conventional DLC systems since it eliminates the need to dedicate RT channel shelf capacity to universal or special service arrangements. From a central office perspective, establishment of additional "virtual" system terminations is the same as the termination of a new conventional DLC system with hardwired channel capacity, even though it simply utilizes existing common shelf capacity. Therefore, for discussion in this section, the term "system" will apply to the unit of carrier capacity terminated at the CO whether associated with a conventional DLC system or a virtual RT termination on an NGDLC/FITL system. *See Figures 9-1 through 9-3 for diagrams of NGDLC system terminations and service provisioning*

TABLE 5-1: ISDN DEPLOYMENT ALTERNATIVES

(IN RELATIVE ORDER OF ECONOMIC PRIORITY)

Alt. No.	CURRENT LOOP ALTERNATIVES TO SERVE ISDN #1-9 FUNDED THRU NORMAL GROWTH BUDGETS	SWITCH TYPE			
		SM2000	5ESS	D100	1AESS
0.	Utilize existing Conklin or FITEL mini-shelf	Yes - Universal Application			
1.	Utilize existing TR-303 system or planned NGDLC e/w TR-303 interface. May include advancement of planned placements.	Yes	Yes	Yes	NA
2.	Utilize existing non-loaded qualified metallic pairs (See Tables A & B). May include cutover of POTS services to other existing or new growth facility. May also include mid-span repeater in existing apparatus case only.	Yes - Universal Application Mid-span repeaters or "Total Reach" DSLs funded by NCU/COU on service order basis.			
3.	Field-groom ISDN lines to COT via existing or planned NGDLC e/w TR-008 interface. May include advancement of planned placements.	Yes (Existing only)	Yes	Yes	Yes (Univ. Only)
4.	Modify planned integrated SLC-5 Mode 1 or Mode 2 system to SLC-5 FP303 and integrate ISDN lines. May include placement of additional/separate TR-303 system if additional ISDN demand requires additional capacity. May also include advancement of planned placements.	Yes WCs per NCU/ COU (Note1)	No	NA	NA
	Note: If ISDN demand >10 BRIs/yr, skip to Alternative #9.				
5.	Utilize vacant capacity in existing or planned Mode 1 universal system. May include advancement of planned placements. May also include cutover of POTS services to other existing or new growth facility (Demand <=10 BRIs/yr).	Yes	Yes	Yes	Yes
6.	Utilize vacant capacity in existing or planned Mode 1 integrated system on IDCU via sidedoor to D4 system. Should be limited to only a few (2-3) per system for permanent demand; Limited only by available IDCU DS-1 capacity for temporary demand.	Yes ~~(Existing Only)~~	Yes	No No longer support-ed by vendor	NA
7.	Convert/re-terminate existing integrated SLC-5 Mode 1 or Mode 2 system to SLC-5 FP303 and integrate ISDN lines. May include cutover of POTS services to existing facility, such as loaded pairs. Slot restrictions eliminated. (ISDN demand <=10 BRIs/yr)	Yes WCs per NCU/ COU (Note1)	No	NA	NA
8.	Reterminate existing Mode 1 integrated from DCLU to IDCU and utilize sidedoor to D4 for ISDN. Should be limited to only a few (2-3) per system for permanent demand; Limited only by available IDCU DS-1 capacity for temporary demand.	No longer recommended. Place Conklin or FITL mini-shelf per item 8A.			
8A	Place Conklin or FITEL mini-shelf in existing or planned conventional DLC site.. (Demand <= 8 BRIs/yr)	Yes - Universal Application To be funded by NCU/COU and placed on a service order basis			
9A.	Unload existing metallic pairs to create qualified facility (see table A). May include cutover of POTS services to other existing or new growth facility.	Yes - Universal Application			
9B.	Unload existing metallic pairs and place mid-span repeaters in existing apparatus cases (see table B). May include cutover of POTS services to other existing or new growth facility.	Yes - Universal Application Mid-span repeaters to be funded by NCU/COU and placed on service order basis.			
9C.	Unload existing metallic pairs and use ADTRAN "Total Reach" DSL (see table A). May include cutover of POTS services to other existing or new growth facility.	Yes - Universal Application "Total Reach" DSLs to be funded by NCU/COU and placed on service-order basis.			

Note 1: SLC-5 FP303 should be deployed only in WCs specifically identified by NCU/COU and must be coordinated with Switch Capacity Management and IBU representatives. Generally limited to existing IDCU/SM2000 capacity specifically designed for small platform (96-line) systems.

Exhibit 5

BellSouth Telecommunications, Inc.
South Carolina Public Service Commission
Docket No. 2001-65-C
NewSouth Communications 1st Interrogatories
May 22, 2001
Item No. 16
Page 1 of 1

REQUEST: Provide the MCF, (million conductor feet) of PULP cable placed in South Carolina by BellSouth for each of the last five years, (1996-2000). If available, provide this information by underground, aerial and buried accounts.

RESPONSE:

1996	16.00	MCF	Underground
1997	3.86	MCF	Underground
1998	2.56	MCF	Underground
	0.99	MCF	Buried
	0.04	MCF	Aerial
1999	4.00	MCF	Underground
2000	0.16	MCF	Buried

BellSouth Telecommunications, Inc.
South Carolina Public Service Commission
Docket No. 2001-65-C
NewSouth Communications 1st Interrogatories
May 22, 2001
Item No. 17
Page 1 of 1

REQUEST: Provide the sheath footage of PULP cable placed in South Carolina by BellSouth for each of the last five years, (1996-2000). If available, provide this information by underground, aerial and buried accounts.

RESPONSE:

1996	6069 feet underground
1997	1910 feet underground
1998	474 feet underground
	551 feet buried
	10 feet aerial
1999	742 feet underground
2000	30 feet buried

BellSouth Telecommunications, Inc.
South Carolina Public Service Commission
Docket No. 2001-65-C
NewSouth Communications 1st Interrogatories
May 22, 2001
Item No. 18
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REQUEST: Provide the MCF. (million conductor feet) of PIC cable placed in South Carolina by BellSouth for each of the last five years, (1996-2000). If available, provide this information by underground, aerial and buried accounts.

RESPONSE:

1996	732	MCF aerial
1996	429	MCF buried
1996	118	MCF underground
1997	503	MCF aerial
1997	344	MCF buried
1997	314	MCF underground
1998	807	MCF aerial
1998	336	MCF buried
1998	408	MCF underground
1999	878	MCF aerial
1999	322	MCF buried
1999	474	MFC underground
2000	685	MCF aerial
2000	920	MCF buried
2000	422	MCF underground

BellSouth Telecommunications, Inc.
South Carolina Public Service Commission
Docket No. 2001-65-C
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REQUEST: Provide the sheath footage of PIC cable placed in South Carolina by BellSouth for each of the last five years, (1996-2000). If available, provide this information by underground, aerial and buried accounts.

RESPONSE:

1996	1962	Kft aerial
1996	1717	Kft buried
1996	268	Kft underground
1997	1592	Kft aerial
1997	883	Kft buried
1997	1395	Kft underground
1998	3747	Kft aerial
1998	511	Kft buried
1998	700	Kft underground
1999	2927	Kft aerial
1999	473	Kft buried
1999	1286	Kft underground
2000	2118	Kft aerial
2000	473	Kft buried
2000	1048	Kft underground